

# SEQUENCE LISTING

<110> Mathis, John P.

<120> Novel Bt Toxin Receptors and Methods of Use

<130> 35718/274644

<150> US 60/455,085

<151> 2003-03-14

<160> 10

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 5765

<212> DNA

<213> Agrotis ipsilon

<220>

<221> CDS

<222> (219)...(5498)

<400> 1

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Phe Thr Ile Arg Ile Asp Asn Glu Val Asp Ala Glu Val Met Leu Ala	
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Asp Phe Thr Asn Ser Gln Ser Arg Arg *			
1755			

gtgttctttt tttttaata aagttaagaa tacacgccac tcctgtaatc ccagaagtta 5578  
 ggggtatgcc tcattatgcc tctcacattt tgaaacgcat gattattaaa gttattatat 5638  
 tttttttttc aacatatcaa taagtacaac acaaatgtaa agatactcgt attattaaat 5698  
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 aaaaaaa 5765

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 <212> PRT  
 <213> Agrotis ipsilon

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Met Gly Val Asp Val Arg Ile Leu Thr Ala Ala Leu Val Leu Leu Ala			
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Ala Ser Ser Thr Thr Ser Ala Gln Gly Met Pro Phe Glu Ser Arg Cys			
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Ala Tyr Met Thr Asp Ile Pro Arg Pro Asp Glu Arg Pro Glu Leu Pro			
	35	40	45
Pro Ile Ile Tyr Asp Gly Leu Ser Trp Asn Glu Arg Pro Leu Val Pro			
	50	55	60
Ala Asn Glu Asp Arg Leu Asp Val Cys Met Asp Glu Phe Phe Arg Gly			
65	70	75	80
Met Gln Tyr Ile Phe Met Glu Glu Glu Ile His Gly Asp Val Pro Ile			
	85	90	95
Ala Lys Leu Asn Tyr Ile Gly Asp Lys Ile Pro Tyr Val His Ser Thr			
	100	105	110
Phe Thr Val Gly Ser Phe Arg Leu Leu Gly Pro Glu Ile Arg Lys Ile			
	115	120	125
Ser Gly Asp Trp His Leu Val Ile Thr Asn Arg Gln Asp Tyr Glu Ala			
	130	135	140
Gly Thr Trp Phe His Ala Phe Thr Ile Arg Ile Asp Asn Glu Val Asp			
145	150	155	160
Ala Glu Val Met Leu Ala Ile Val Asn Ile Asp Asp Asn Asp Pro Leu			
	165	170	175
Ile Asp Leu Ser Glu Pro Cys Gln Ile Ala Glu Gln Arg Asp Ala Arg			
	180	185	190
Ser Val Lys Thr Cys Arg Tyr Ile Val His Asp Val Asp Gly Glu Ile			
	195	200	205
Ser Thr Arg Phe Met Arg Tyr Glu Ile Glu Ser Gly Arg Gly Asp Glu			

210	215	220
Glu Val Phe Ser Leu	Val Arg Glu Gln Ala	Pro Asn Asn Glu Trp Met
225	230	235
Trp Cys Tyr Met	Val Val Glu Val Lys Gly	Ser Leu Asp Phe Ala Gln
245	250	255
Asn Pro Leu His Ile	Phe Arg Ala His Ala	Phe Asp Ser Lys Asp Asn
260	265	270
Thr His Ser Val Leu	Met Thr Val Glu Val Lys	Asn Val Glu Gln Arg
275	280	285
Pro Pro Gln Trp Ile	Glu Ile Phe Ala Val Gln	Gln Phe Asp Glu Lys
290	295	300
Ile Lys Lys Ser Phe	Arg Val Arg Ala Ile Asp	Ala Asp Thr Gly Ile
305	310	315
Asn Lys Thr Ile Ser	Tyr Arg Leu Arg Thr Ala	Val Gly Glu Glu Asn
325	330	335
Leu Phe Glu Leu Glu	Thr Lys Glu Gly Ser Gln	Gly Val Trp Leu His
340	345	350
Val Gly Pro Ile Asp	Arg Asp Glu Leu Glu Lys	Glu Val Phe Leu Leu
355	360	365
Ser Ile Ile Ala Tyr	Lys Tyr Gly Asp Asp Gly	Thr Leu Tyr Glu Thr
370	375	380
Pro Ala Asn Ile Thr	Ile Ile Ile Asn Asp Val	Asn Asp Gln Leu Pro
385	390	395
Ser Pro Leu Lys Glu	Gly Gly Val Tyr Thr Ile	Asp Ile Met Glu Glu
405	410	415
Thr Pro Met Thr Leu	Asn Leu Glu Asn Phe	Gly Phe His Asp Arg Asp
420	425	430
Leu Gly Pro Asn Ala	Gln Tyr Asn Val Arg Leu	Glu Ser Val Tyr Pro
435	440	445
Asp Gly Val His Glu	Ala Phe Tyr Ile Ala Pro	Glu Arg Gly Tyr Gln
450	455	460
Arg Gln Ser Phe Phe	Leu Ser Thr Gln Asn His	His Met Leu Asp Tyr
465	470	475
Asp Asn Glu Thr Val	Asp Phe Thr Lys Ile Gln	Ile Lys Ala Val Ala
485	490	495
Ile Asp Ser Leu Asn	Asn Thr Met Lys Gly Phe	Ala Thr Ile Asn Ile
500	505	510
Asn Leu Ile Asn Trp	Asn Asp Glu Leu Pro Ile	Phe Lys Asn Ser Val
515	520	525
Gln Asn Val Ser Phe	Pro Glu Thr Val Ala Ala	Gly Phe His Val Ala
530	535	540
Thr Ile Lys Ala Glu	Asp Arg Asp Val Gly Asp	Arg Val Glu His Ser
545	550	555
Leu Met Gly Asn Ala	Val Asp Phe Leu Thr Ile	Asp Lys Tyr Ser Gly
565	570	575
Glu Ile Phe Val Ala	Val Asn Asn Ser Phe Asn	Tyr His Arg Gln Asn
580	585	590
Glu Leu Phe Ile Gln	Ile Arg Ala Asp Asp Thr	Leu Gly Glu Gly Pro
595	600	605
Tyr His Thr Thr Thr	Ser Gln Leu Val Ile Tyr	Leu Glu Asp Val Asn
610	615	620
Asn Thr Pro Pro Val	Leu Arg Leu Pro Arg Arg	Gly Pro His Val Glu
625	630	635
Glu Asn Val Pro His	Gly His Pro Ile Thr Asn	Asp Asp Gly Ile Gln
645	650	655
Leu Ile Ala Ser Asp	Pro Asp Thr Thr Ala Glu	Leu Trp Phe Glu Ile
660	665	670

Asp	Trp	Glu	Glu	Ser	Tyr	Ala	Thr	Lys	Gln	Gly	Asn	Glu	Thr	Leu	Lys	675	680	685
Asp	Glu	Tyr	Arg	Asn	Cys	Ile	Glu	Ile	Leu	Thr	Arg	Tyr	Gln	Asp	Glu	690	695	700
Asn	Arg	Lys	Gly	Glu	Ala	Tyr	Gly	Val	Leu	Glu	Val	Arg	Gln	Ile	Arg	705	710	715
Asp	Asp	Pro	Val	Val	Thr	Ile	Asp	Tyr	Glu	Glu	Phe	Glu	Val	Leu	Tyr	720	725	730
Leu	Val	Val	Arg	Val	Arg	Asp	Arg	Asn	Thr	Thr	Leu	Gly	Asp	Asp	Tyr	735	740	745
Asp	Glu	Gly	Thr	Leu	Thr	Ile	Thr	Ile	Ile	Asp	Met	Asn	Asp	Asn	Trp	750	755	760
Pro	Thr	Trp	Glu	Glu	Gly	Gln	Leu	Thr	Gln	Gln	Phe	Arg	Val	Arg	Glu	765	770	775
Met	Ser	Leu	Ser	Gly	Val	Val	Ile	Gly	Ser	Leu	Arg	Ala	Thr	Asp	Arg	780	785	790
Asp	Gly	Pro	Leu	Tyr	Asn	Gln	Val	Arg	Tyr	Thr	Ile	Gln	Pro	Val	Asp	795	800	805
Gly	Thr	Pro	Ala	Asp	Leu	Val	Ala	Ile	Asp	Phe	Arg	Thr	Gly	Gln	Met	810	815	820
Thr	Val	Gln	Lys	Asn	Gln	Ala	Ile	Asp	Ala	Asp	Val	Pro	Pro	Arg	Phe	825	830	835
Asn	Leu	Tyr	Tyr	Thr	Val	Thr	Ala	Ser	Asp	Lys	Cys	Ser	Met	Glu	Asp	840	845	850
Gln	Ser	Asn	Cys	Pro	Asp	Asp	Lys	Thr	Tyr	Trp	Asn	Thr	Thr	Ala	Lys	855	860	865
Ile	Ala	Ile	Gln	Val	Ile	Asp	Thr	Asn	Asn	Lys	Val	Pro	Phe	Val	Glu	870	875	880
Pro	Glu	Lys	Phe	Lys	Asn	Glu	Val	Thr	Ile	Val	Glu	Asp	Pro	Val	Thr	885	890	895
Gly	Asp	Val	Thr	Phe	Leu	Thr	Ser	Glu	Ser	Ile	Tyr	Glu	Asp	Ala	Val	900	905	910
Ser	Gly	Asp	His	Val	Phe	Gln	Leu	Phe	Val	Gly	Asp	Leu	Asp	Arg	Asp	915	920	925
Leu	Pro	Asn	Asn	Asn	Val	Ser	Tyr	Thr	Ile	Asn	Phe	Gly	Val	Asn	Pro	930	935	940
Arg	Ile	Arg	Asp	Phe	Phe	Glu	Val	Asp	Leu	Val	Thr	Gly	Trp	Val	Arg	945	950	955
Val	His	Tyr	Pro	Gly	Pro	Asp	Lys	Leu	Asp	Arg	Asp	Gly	Asp	Glu	Pro	960	965	970
Thr	His	Arg	Ile	His	Phe	Ser	Ile	Phe	Asp	Asn	Phe	Met	Ser	Glu	Gly	975	980	985
Glu	Pro	Asn	Arg	Asn	Gln	Ile	Ser	Gly	Glu	Ala	Leu	Ile	Ile	Leu	Leu	990	995	1000
Asp	Val	Asn	Asp	Asn	Lys	Pro	Glu	Leu	Pro	Ser	Pro	Asp	Ser	Phe	Pro	1005	1010	1015
Pro	Trp	Thr	Val	Ser	Glu	Ser	Val	Val	Glu	Gly	Val	Arg	Ile	Pro	Pro	1020	1025	1030
Glu	Ile	Leu	Ala	Pro	Asp	Arg	Asp	Glu	Pro	Gly	Thr	Asp	Asn	Ser	Arg	1035	1040	1045
Val	Ala	Tyr	Asp	Leu	Leu	Gly	Val	Thr	Pro	Glu	Arg	Asp	Ile	Glu	Val	1050	1055	1060
Pro	Gln	Leu	Phe	Lys	Ile	Glu	Thr	Ile	Glu	Lys	Asp	Leu	Gly	Ile	Asn	1065	1070	1075
Gln	Thr	Gly	Ile	Leu	Glu	Thr	Val	Thr	Pro	Leu	Gln	Gly	Tyr	Trp	Gly	1080	1085	1090
Thr	Tyr	Glu	Ile	His	Ile	Lys	Ala	Phe	Asp	His	Gly	Asp	Pro	Arg	Gln	1095	1100	1105



Leu Gln Leu Thr Asn Val Gln Ser Gly Leu Pro Pro Ser Val Ala Gly  
 1585 1590 1595 1600  
 Glu Asp Gln Met Leu Ala Val Tyr Ile Leu Ala Gly Leu Ala Gly Val  
 1605 1610 1615  
 Leu Ala Leu Leu Cys Ile Val Leu Leu Ile Thr Phe Ile Ile Arg Asn  
 1620 1625 1630  
 Arg Ser Leu Asn Arg Arg Ile Ala Ala Leu Ser Ala Thr Lys Tyr Asn  
 1635 1640 1645  
 Ser Val Asp Ser Asn Leu Asn Arg Ile Gly Leu Ala Ala Pro Gly Thr  
 1650 1655 1660  
 Asn Lys His Ala Phe Glu Pro Asn Pro Ile Trp Asn Glu Thr Ile Lys  
 1665 1670 1675 1680  
 Ala Pro Asp Phe Asp Ala Ile Ser Glu Gln Ser Asn Asp Ser Asp Leu  
 1685 1690 1695  
 Ile Gly Ile Glu Asp Leu Pro Gln Phe Arg Asn Asp Tyr Phe Pro Pro  
 1700 1705 1710  
 Glu Gln Glu Ile Asp Met Asn Ser Asn Asp Ile Gly Tyr Pro Glu Met  
 1715 1720 1725  
 Asp Ala Arg Asn Pro Leu Pro Asn His Glu Asn Asn Phe Gly Tyr Ser  
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 Asn Ala Pro Phe Asn Pro Asp Phe Thr Asn Ser Gln Ser Arg Arg  
 1745 1750 1755

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 <223> y = T or C

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24

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21

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21

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 Thr Ala Thr Ala Gln Arg Asp Arg Cys Gly Tyr Met Val Glu Ile Pro  
 20 25 30







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945					950					955					960
Thr	Thr	Ser	Glu	Val	Leu	Asp	Arg	Asp	Gly	Glu	Glu	Pro	Glu	His	Arg
				965					970					975	
Ile	Ile	Phe	Thr	Ile	Val	Asp	Asn	Leu	Glu	Gly	Ala	Gly	Asp	Gly	Asn
			980					985					990		
Gln	Asn	Thr	Ile	Ser	Thr	Glu	Val	Arg	Val	Ile	Leu	Leu	Asp	Ile	Asn
	995						1000					1005			
Asp	Asn	Lys	Pro	Glu	Leu	Pro	Ile	Pro	Asp	Gly	Glu	Phe	Trp	Thr	Val
1010						1015					1020				
Ser	Glu	Gly	Glu	Val	Glu	Gly	Lys	Arg	Ile	Pro	Pro	Glu	Ile	His	Ala
1025					1030					1035					1040
His	Asp	Arg	Asp	Glu	Pro	Phe	Asn	Asp	Asn	Ser	Arg	Val	Gly	Tyr	Glu
				1045					1050					1055	
Ile	Arg	Ser	Ile	Lys	Leu	Ile	Asn	Arg	Asp	Ile	Glu	Leu	Pro	Gln	Asp
			1060					1065					1070		
Pro	Phe	Lys	Ile	Ile	Thr	Ile	Asp	Asp	Leu	Asp	Thr	Trp	Lys	Phe	Val
		1075					1080					1085			
Gly	Glu	Leu	Glu	Thr	Thr	Met	Asp	Leu	Arg	Gly	Tyr	Trp	Gly	Thr	Tyr
1090						1095					1100				
Asp	Val	Glu	Ile	Arg	Ala	Phe	Asp	His	Gly	Phe	Pro	Met	Leu	Asp	Ser
1105					1110					1115					1120
Phe	Glu	Thr	Tyr	Gln	Leu	Thr	Val	Arg	Pro	Tyr	Asn	Phe	His	Ser	Pro
				1125					1130					1135	
Val	Phe	Val	Phe	Pro	Thr	Pro	Gly	Ser	Thr	Ile	Arg	Leu	Ser	Arg	Glu
			1140					1145					1150		
Arg	Ala	Ile	Val	Asn	Gly	Met	Leu	Ala	Leu	Ala	Asn	Ile	Ala	Ser	Gly
		1155					1160					1165			
Glu	Phe	Leu	Asp	Arg	Leu	Ser	Ala	Thr	Asp	Glu	Asp	Gly	Leu	His	Ala
1170						1175					1180				
Gly	Arg	Val	Thr	Phe	Ser	Ile	Ala	Gly	Asn	Asp	Glu	Ala	Ala	Glu	Tyr
1185					1190					1195					1200
Phe	Asn	Val	Leu	Asn	Asp	Gly	Asp	Asn	Ser	Ala	Met	Leu	Thr	Leu	Lys
				1205					1210					1215	
Gln	Ala	Leu	Pro	Ala	Gly	Val	Gln	Gln	Phe	Glu	Leu	Val	Ile	Arg	Ala
			1220					1225					1230		
Thr	Asp	Gly	Gly	Thr	Glu	Pro	Gly	Pro	Arg	Ser	Thr	Asp	Cys	Ser	Val
		1235					1240					1245			
Thr	Val	Val	Phe	Val	Met	Thr	Gln	Gly	Asp	Pro	Val	Phe	Asp	Asp	Asn
1250						1255					1260				
Ala	Ala	Ser	Val	Arg	Phe	Val	Glu	Lys	Glu	Ala	Gly	Met	Ser	Glu	Lys
1265					1270					1275					1280
Phe	Gln	Leu	Pro	Gln	Ala	Asp	Asp	Pro	Lys	Asn	Tyr	Arg	Cys	Met	Asp
				1285					1290					1295	
Asp	Cys	His	Thr	Ile	Tyr	Tyr	Ser	Ile	Val	Asp	Gly	Asn	Asp	Gly	Asp
			1300					1305					1310		
His	Phe	Ala	Val	Glu	Pro	Glu	Thr	Asn	Val	Ile	Tyr	Leu	Leu	Lys	Pro
		1315					1320					1325			
Leu	Asp	Arg	Ser	Gln	Gln	Glu	Gln	Tyr	Arg	Val	Val	Val	Ala	Ala	Ser
	1330						1335				1340				
Asn	Thr	Pro	Gly	Gly	Thr	Ser	Thr	Leu	Ser	Ser	Ser	Leu	Leu	Thr	Val
1345					1350					1355					1360
Thr	Ile	Gly	Val	Arg	Glu	Ala	Asn	Pro	Arg	Pro	Ile	Phe	Glu	Ser	Glu
			1365					1370					1375		
Phe	Tyr	Thr	Ala	Gly	Val	Leu	His	Thr	Asp	Ser	Ile	His	Lys	Glu	Leu
			1380					1385					1390		
Val	Tyr	Leu	Ala	Ala	Lys	His	Ser	Glu	Gly	Leu	Pro	Ile	Val	Tyr	Ser

1395	1400	1405
Ile Asp Gln Glu Thr Met Lys	Ile Asp Glu Ser Leu Gln Thr Val Val	
1410	1415	1420
Glu Asp Ala Phe Asp Ile Asn Ser Ala Thr Gly Val Ile Ser Leu Asn		
1425	1430	1435
Phe Gln Pro Thr Ser Val Met His Gly Ser Phe Asp Phe Glu Val Val		1440
	1445	1450
Ala Ser Asp Thr Arg Gly Ala Ser Asp Arg Ala Lys Val Ser Ile Tyr		1455
	1460	1465
Met Ile Ser Thr Arg Val Arg Val Ala Phe Leu Phe Tyr Asn Thr Glu		1470
	1475	1480
Ala Glu Val Asn Glu Arg Arg Asn Phe Ile Ala Gln Thr Phe Ala Asn		1485
	1490	1495
Ala Phe Gly Met Thr Cys Asn Ile Asp Ser Val Leu Pro Ala Thr Asp		1500
1505	1510	1515
Ala Asn Gly Val Ile Arg Glu Gly Tyr Thr Glu Leu Gln Ala His Phe		1520
	1525	1530
Ile Arg Asp Asp Gln Pro Val Pro Ala Asp Tyr Ile Glu Gly Leu Phe		1535
	1540	1545
Thr Glu Leu Asn Thr Leu Arg Asp Ile Arg Glu Val Leu Ser Thr Gln		1550
	1555	1560
Gln Leu Thr Leu Leu Asp Phe Ala Ala Gly Gly Ser Ala Val Leu Pro		1565
	1570	1575
Gly Gly Glu Tyr Ala Leu Ala Val Tyr Ile Leu Ala Gly Ile Ala Ala		1580
1585	1590	1595
Leu Leu Ala Val Ile Cys Leu Ala Leu Leu Ile Ala Phe Phe Ile Arg		1600
	1605	1610
Asn Arg Thr Leu Asn Arg Arg Ile Glu Ala Leu Thr Ile Lys Asp Val		1615
	1620	1625
Pro Thr Asp Ile Glu Pro Asn His Ala Ser Val Ala Val Leu Asn Ile		1630
	1635	1640
Asn Lys His Thr Glu Pro Gly Ser Asn Pro Phe Tyr Asn Pro Asp Val		1645
	1650	1655
Lys Thr Pro Asn Phe Asp Thr Ile Ser Glu Val Ser Asp Asp Leu Leu		1660
1665	1670	1675
Asp Val Glu Asp Leu Glu Gln Phe Gly Lys Asp Tyr Phe Pro Pro Glu		1680
	1685	1690
Asn Glu Ile Glu Ser Leu Asn Phe Ala Arg Asn Pro Ile Ala Thr His		1695
	1700	1705
Gly Asn Asn Phe Gly Val Asn Ser Ser Pro Ser Asn Pro Glu Phe Ser		1710
	1715	1720
Asn Ser Gln Phe Arg Ser		1725
1730		

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<211> 1730

<212> PRT

<213> Helicoverpa zea

<400> 7

Met Ala Val Asp Val Arg Ile Leu Thr Ala Ala Val Phe Ile Ile Ala	
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Ala His Leu Thr Phe Ala Gln Asp Cys Ser Tyr Met Val Ala Ile Pro	
	10
	15
	20
Arg Pro Glu Arg Pro Asp Phe Pro Ser Leu Asn Phe Asp Gly Ile Pro	
	25
	30
	35
	40
	45

Trp	Ser	Arg	Tyr	Pro	Leu	Ile	Pro	Val	Glu	Gly	Arg	Glu	Asp	Val	Cys	50	55	60
Met	Asn	Glu	Phe	Gln	Pro	Asp	Ala	Leu	Asn	Pro	Val	Thr	Val	Ile	Phe	65	70	75
Met	Glu	Glu	Glu	Ile	Glu	Gly	Asp	Val	Ala	Ile	Ala	Arg	Leu	Asn	Tyr	85	90	95
Arg	Gly	Thr	Asn	Thr	Pro	Thr	Ile	Val	Ser	Pro	Phe	Ser	Phe	Gly	Thr	100	105	110
Phe	Asn	Met	Leu	Gly	Pro	Val	Ile	Arg	Arg	Ile	Pro	Glu	Asn	Gly	Gly	115	120	125
Asp	Trp	His	Leu	Val	Ile	Thr	Gln	Arg	Gln	Asp	Tyr	Glu	Thr	Pro	Gly	130	135	140
Met	Gln	Gln	Tyr	Ile	Phe	Asp	Val	Arg	Val	Asp	Asp	Glu	Pro	Leu	Val	145	150	155
Ala	Thr	Val	Met	Leu	Leu	Ile	Val	Asn	Ile	Asp	Asp	Asn	Asp	Pro	Ile	165	170	175
Ile	Gln	Met	Phe	Glu	Pro	Cys	Asp	Ile	Pro	Glu	Arg	Gly	Glu	Thr	Gly	180	185	190
Ile	Thr	Ser	Cys	Lys	Tyr	Thr	Val	Ser	Asp	Ala	Asp	Gly	Glu	Ile	Ser	195	200	205
Thr	Arg	Phe	Met	Arg	Phe	Glu	Ile	Ser	Ser	Asp	Arg	Asp	Asp	Asp	Glu	210	215	220
Tyr	Phe	Glu	Leu	Val	Arg	Glu	Asn	Ile	Gln	Gly	Gln	Trp	Met	Tyr	Val	225	230	235
His	Met	Arg	Val	His	Val	Lys	Lys	Pro	Leu	Asp	Tyr	Glu	Glu	Asn	Pro	245	250	255
Leu	His	Leu	Phe	Arg	Val	Thr	Ala	Tyr	Asp	Ser	Leu	Pro	Asn	Thr	His	260	265	270
Thr	Val	Thr	Met	Met	Val	Gln	Val	Glu	Asn	Val	Glu	Asn	Arg	Pro	Pro	275	280	285
Arg	Trp	Met	Glu	Ile	Phe	Ala	Val	Gln	Gln	Phe	Asp	Glu	Lys	Thr	Glu	290	295	300
Gln	Ser	Phe	Arg	Val	Arg	Ala	Ile	Asp	Gly	Asp	Thr	Gly	Ile	Asp	Lys	305	310	315
Pro	Ile	Phe	Tyr	Arg	Ile	Glu	Thr	Glu	Lys	Gly	Glu	Glu	Asp	Leu	Phe	325	330	335
Ser	Ile	Gln	Thr	Ile	Glu	Gly	Gly	Arg	Glu	Gly	Ala	Trp	Phe	Asn	Val	340	345	350
Ala	Pro	Ile	Asp	Arg	Asp	Thr	Leu	Glu	Lys	Glu	Val	Phe	His	Val	Ser	355	360	365
Ile	Ile	Ala	Tyr	Lys	Tyr	Gly	Asp	Asn	Asp	Val	Glu	Gly	Ser	Ser	Ser	370	375	380
Phe	Gln	Ser	Lys	Thr	Asp	Val	Val	Ile	Ile	Val	Asn	Asp	Val	Asn	Asp	385	390	395
Gln	Ala	Pro	Leu	Pro	Phe	Arg	Glu	Glu	Tyr	Ser	Ile	Glu	Ile	Met	Glu	405	410	415
Glu	Thr	Ala	Met	Thr	Leu	Asn	Leu	Glu	Asp	Phe	Gly	Phe	His	Asp	Arg	420	425	430
Asp	Leu	Gly	Pro	His	Ala	Gln	Tyr	Thr	Val	His	Leu	Glu	Ser	Ile	His	435	440	445
Pro	Pro	Arg	Ala	His	Glu	Ala	Phe	Tyr	Ile	Ala	Pro	Glu	Val	Gly	Tyr	450	455	460
Gln	Arg	Gln	Ser	Phe	Ile	Met	Gly	Thr	Gln	Asn	His	His	Met	Leu	Asp	465	470	475
Phe	Glu	Val	Pro	Glu	Phe	Gln	Asn	Ile	Gln	Leu	Arg	Ala	Val	Ala	Ile	485	490	495
Asp	Met	Asp	Asp	Pro	Lys	Trp	Val	Gly	Ile	Ala	Ile	Ile	Asn	Ile	Lys			

			500					505					510				
Leu	Ile	Asn	Trp	Asn	Asp	Glu	Leu	Pro	Met	Phe	Glu	Ser	Asp	Val	Gln		
		515					520					525					
Thr	Val	Ser	Phe	Asp	Glu	Thr	Glu	Gly	Ala	Gly	Phe	Tyr	Val	Ala	Thr		
	530					535					540						
Val	Val	Ala	Lys	Asp	Arg	Asp	Val	Gly	Asp	Lys	Val	Glu	His	Ser	Leu		
545				550						555					560		
Met	Gly	Asn	Ala	Val	Ser	Tyr	Leu	Arg	Ile	Asp	Lys	Glu	Thr	Gly	Glu		
			565					570						575			
Ile	Phe	Val	Thr	Glu	Asn	Glu	Ala	Phe	Asn	Tyr	His	Arg	Gln	Asn	Glu		
		580					585						590				
Leu	Phe	Val	Gln	Ile	Pro	Ala	Asp	Thr	Leu	Gly	Glu	Pro	Tyr	Asn			
	595					600				605							
Thr	Asn	Thr	Thr	Gln	Leu	Val	Ile	Lys	Leu	Arg	Asp	Ile	Asn	Asn	Thr		
	610					615				620							
Pro	Pro	Thr	Leu	Arg	Leu	Pro	Arg	Ala	Thr	Pro	Ser	Val	Glu	Glu	Asn		
625				630						635					640		
Val	Pro	Asp	Gly	Phe	Val	Ile	Pro	Thr	Gln	Leu	His	Ala	Thr	Asp	Pro		
			645						650					655			
Asp	Thr	Thr	Ala	Glu	Leu	Arg	Phe	Glu	Ile	Asp	Trp	Gln	Asn	Ser	Tyr		
			660					665					670				
Ala	Thr	Lys	Gln	Gly	Arg	Asn	Thr	Asp	Ser	Lys	Glu	Tyr	Ile	Gly	Cys		
	675						680					685					
Ile	Glu	Ile	Glu	Thr	Ile	Tyr	Pro	Asn	Ile	Asn	Gln	Arg	Gly	Asn	Ala		
	690					695				700							
Ile	Gly	Arg	Val	Val	Val	Arg	Glu	Ile	Arg	Asp	Gly	Val	Thr	Ile	Asp		
705				710					715						720		
Tyr	Glu	Met	Phe	Glu	Val	Leu	Tyr	Leu	Thr	Val	Ile	Val	Arg	Asp	Leu		
			725						730					735			
Asn	Thr	Val	Ile	Gly	Glu	Asp	His	Asp	Ile	Ser	Thr	Phe	Thr	Ile	Thr		
		740						745					750				
Ile	Ile	Asp	Met	Asn	Asp	Asn	Pro	Pro	Leu	Trp	Val	Glu	Gly	Thr	Leu		
	755					760						765					
Thr	Gln	Glu	Phe	Arg	Val	Arg	Glu	Val	Ala	Ala	Ser	Gly	Val	Val	Ile		
	770					775					780						
Gly	Ser	Val	Leu	Ala	Thr	Asp	Ile	Asp	Gly	Pro	Leu	Tyr	Asn	Gln	Val		
785				790					795					800			
Arg	Tyr	Thr	Ile	Thr	Pro	Arg	Leu	Asp	Thr	Pro	Glu	Asp	Leu	Val	Asp		
			805						810					815			
Ile	Asp	Phe	Asn	Thr	Gly	Gln	Ile	Ser	Val	Lys	Leu	His	Gln	Ala	Ile		
			820					825					830				
Asp	Ala	Asp	Glu	Pro	Pro	Arg	Gln	Asn	Leu	Tyr	Tyr	Thr	Val	Ile	Ala		
	835						840					845					
Ser	Asp	Lys	Cys	Asp	Leu	Leu	Thr	Val	Thr	Glu	Cys	Pro	Pro	Asp	Pro		
	850					855					860						
Thr	Tyr	Phe	Glu	Thr	Pro	Gly	Glu	Ile	Thr	Ile	His	Ile	Thr	Asp	Thr		
865				870						875				880			
Asn	Asn	Lys	Val	Pro	Gln	Val	Glu	Asp	Asp	Lys	Phe	Glu	Ala	Thr	Val		
			885						890					895			
Tyr	Ile	Tyr	Glu	Gly	Ala	Asp	Asp	Gly	Gln	His	Val	Val	Gln	Ile	Tyr		
		900						905					910				
Ala	Ser	Asp	Leu	Asp	Arg	Asp	Glu	Ile	Tyr	His	Lys	Val	Ser	Tyr	Gln		
	915						920						925				
Ile	Asn	Tyr	Ala	Ile	Asn	Ser	Arg	Leu	Arg	Asp	Phe	Phe	Glu	Met	Asp		
	930					935					940						
Leu	Glu	Ser	Gly	Leu	Val	Tyr	Val	Asn	Asn	Thr	Ala	Gly	Glu	Leu	Leu		
945				950					955						960		

Asp Arg Asp Gly Asp Glu Pro Thr His Arg Ile Phe Phe Asn Val Ile  
 965 970 975  
 Asp Asn Phe Tyr Gly Glu Gly Asp Gly Asn Arg Asn Gln Asn Glu Thr  
 980 985 990  
 Gln Val Leu Val Val Leu Leu Asp Ile Asn Asp Asn Tyr Pro Glu Leu  
 995 1000 1005  
 Pro Glu Thr Ile Pro Trp Ala Ile Ser Glu Ser Leu Glu Leu Gly Glu  
 1010 1015 1020  
 Arg Val Gln Pro Glu Ile Phe Ala Arg Asp Arg Asp Glu Pro Gly Thr  
 1025 1030 1035 1040  
 Asp Asn Ser Arg Val Ala Tyr Ala Ile Thr Gly Leu Ala Ser Thr Asp  
 1045 1050 1055  
 Arg Asp Ile Gln Val Pro Asn Leu Phe Asn Met Ile Thr Ile Glu Arg  
 1060 1065 1070  
 Asp Arg Gly Ile Asp Gln Thr Gly Ile Leu Glu Ala Ala Met Asp Leu  
 1075 1080 1085  
 Arg Gly Tyr Trp Gly Thr Tyr Gln Ile Asp Ile Gln Ala Tyr Asp His  
 1090 1095 1100  
 Gly Ile Pro Gln Arg Ile Ser Asn Gln Lys Tyr Pro Leu Val Ile Arg  
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 Pro Tyr Asn Phe His Asp Pro Val Phe Val Phe Pro Gln Pro Gly Ser  
 1125 1130 1135  
 Thr Ile Arg Leu Ala Lys Glu Arg Ala Val Val Asn Gly Ile Leu Ala  
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 Thr Val Asp Gly Glu Phe Leu Asp Arg Ile Val Ala Thr Asp Glu Asp  
 1155 1160 1165  
 Gly Leu Glu Ala Gly Leu Val Thr Phe Ser Ile Ala Gly Asp Asp Glu  
 1170 1175 1180  
 Asp Ala Gln Phe Phe Asp Val Leu Asn Asp Gly Val Asn Ser Gly Ala  
 1185 1190 1195 1200  
 Leu Thr Leu Thr Arg Leu Phe Pro Glu Glu Phe Arg Glu Phe Gln Val  
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 Thr Ile Arg Ala Thr Asp Gly Gly Thr Glu Pro Gly Pro Arg Ser Thr  
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 Asp Cys Leu Val Thr Val Val Phe Val Pro Thr Gln Gly Glu Pro Val  
 1235 1240 1245  
 Phe Glu Asp Arg Thr Tyr Thr Val Ala Phe Val Glu Lys Asp Glu Gly  
 1250 1255 1260  
 Met Leu Glu Glu Ala Glu Leu Pro Arg Ala Ser Asp Pro Arg Asn Ile  
 1265 1270 1275 1280  
 Met Cys Glu Asp Asp Cys His Asp Thr Tyr Tyr Ser Ile Val Gly Gly  
 1285 1290 1295  
 Asn Ser Gly Glu His Phe Thr Val Asp Pro Arg Thr Asn Val Leu Ser  
 1300 1305 1310  
 Leu Val Lys Pro Leu Asp Arg Ser Glu Gln Glu Thr His Thr Leu Ile  
 1315 1320 1325  
 Ile Gly Ala Ser Asp Thr Pro Asn Pro Ala Ala Val Leu Gln Ala Ser  
 1330 1335 1340  
 Thr Leu Thr Val Thr Val Asn Val Arg Glu Ala Asn Pro Arg Pro Val  
 1345 1350 1355 1360  
 Phe Gln Arg Ala Leu Tyr Thr Ala Gly Ile Ser Ala Gly Asp Phe Ile  
 1365 1370 1375  
 Glu Arg Asn Leu Leu Thr Leu Val Ala Thr His Ser Glu Asp Leu Pro  
 1380 1385 1390  
 Ile Thr Tyr Thr Leu Ile Gln Glu Ser Met Glu Ala Asp Pro Thr Leu  
 1395 1400 1405  
 Glu Ala Val Gln Glu Ser Ala Phe Ile Leu Asn Pro Glu Thr Gly Val

1410	1415	1420
Leu Ser Leu Asn Phe Gln Pro Thr Ala Ser Met His Gly Met Phe Glu		
1425	1430	1435
Phe Glu Val Lys Ala Thr Asp Ser Arg Thr Glu Thr Ala Arg Thr Glu		1440
	1445	1450
Val Lys Val Tyr Leu Ile Ser Asp Arg Asn Arg Val Phe Phe Thr Phe		1455
	1460	1465
Asn Asn Pro Leu Pro Glu Val Thr Pro Gln Glu Asp Phe Ile Ala Glu		1470
	1475	1480
Thr Phe Thr Ala Phe Phe Gly Met Thr Cys Asn Ile Asp Gln Ser Trp		1485
	1490	1495
Trp Ala Ser Asp Pro Val Thr Gly Ala Thr Lys Asp Asp Gln Thr Glu		1500
1505	1510	1515
Val Arg Ala His Phe Ile Arg Asp Asp Leu Pro Val Pro Ala Glu Glu		1520
	1525	1530
Ile Glu Gln Leu Arg Gly Asn Pro Thr Leu Val Asn Ser Ile Gln Arg		1535
	1540	1545
Ala Leu Glu Glu Gln Asn Leu Gln Leu Ala Asp Leu Phe Thr Gly Glu		1550
	1555	1560
Thr Pro Ile Leu Gly Gly Asp Ala Gln Ala Arg Ala Leu Tyr Ala Leu		1565
	1570	1575
Ala Ala Val Ala Ala Ala Leu Ala Leu Ile Val Val Val Leu Leu Ile		1580
1585	1590	1595
Val Phe Phe Val Arg Thr Arg Thr Leu Asn Arg Arg Leu Gln Ala Leu		1600
	1605	1610
Ser Met Thr Lys Tyr Ser Ser Gln Asp Ser Gly Leu Asn Arg Val Gly		1615
	1620	1625
Leu Ala Ala Pro Gly Thr Asn Lys His Ala Val Glu Gly Ser Asn Pro		1630
	1635	1640
Ile Trp Asn Glu Thr Leu Lys Ala Pro Asp Phe Asp Ala Leu Ser Glu		1645
	1650	1655
Gln Ser Tyr Asp Ser Asp Leu Ile Gly Ile Glu Asp Leu Pro Gln Phe		1660
1665	1670	1675
Arg Asn Asp Tyr Phe Pro Pro Glu Glu Gly Ser Ser Met Arg Gly Val		1680
	1685	1690
Val Asn Glu His Val Pro Glu Ser Ile Ala Asn His Asn Asn Asn Phe		1695
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	1715	1720
Arg Arg		1725
1730		

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<211> 1717

<212> PRT

<213> Ostrinia nubilalis

<400> 8

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Arg Pro Glu Thr Pro Glu Leu Pro Pro Ile Asp Tyr Glu Gly Lys Ser
35 40 45
Trp Ser Glu Gln Pro Leu Ile Pro Gly Pro Thr Arg Glu Glu Val Cys
50 55 60

Met	Glu	Asn	Phe	Leu	Pro	Asp	Gln	Met	Ile	Gln	Val	Ile	Tyr	Met	Glu
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Glu	Glu	Ile	Glu	Gly	Asp	Val	Ile	Ile	Ala	Lys	Leu	Asn	Tyr	Gln	Gly
				85					90					95	
Ser	Asn	Thr	Pro	Val	Leu	Ser	Ile	Met	Ser	Gly	Gln	Pro	Arg	Ala	Gln
			100					105					110		
Leu	Gly	Pro	Glu	Phe	Arg	Gln	Asn	Glu	Ala	Asp	Gly	Gln	Trp	Ser	Leu
		115					120					125			
Val	Ile	Thr	Gln	Arg	Gln	Asp	Tyr	Glu	Thr	Ala	Thr	Met	Gln	Ser	Tyr
	130					135					140				
Val	Phe	Ser	Ile	Gln	Val	Glu	Gly	Glu	Ser	Gln	Ala	Val	Leu	Val	Ala
145					150					155					160
Leu	Glu	Ile	Val	Asn	Ile	Asp	Asp	Asn	Pro	Pro	Ile	Leu	Gln	Val	Val
				165					170					175	
Ser	Ala	Cys	Val	Ile	Pro	Glu	His	Gly	Glu	Ala	Arg	Leu	Thr	Asp	Cys
			180					185					190		
Val	Tyr	Gln	Val	Ser	Asp	Arg	Asp	Gly	Glu	Ile	Ser	Thr	Arg	Phe	Met
		195					200					205			
Thr	Phe	Arg	Val	Asp	Ser	Ser	Arg	Ala	Ala	Asp	Glu	Ser	Ile	Phe	Tyr
	210					215					220				
Met	Val	Gly	Glu	Tyr	Asp	Pro	Ser	Asp	Trp	Phe	Asn	Met	Lys	Met	Thr
225					230					235					240
Val	Gly	Ile	Asn	Ser	Pro	Leu	Asn	Phe	Glu	Thr	Thr	Gln	Leu	His	Ile
			245						250					255	
Phe	Ser	Val	Thr	Ala	Ser	Asp	Ser	Leu	Pro	Asn	Asn	His	Thr	Val	Thr
			260					265					270		
Met	Met	Val	Gln	Val	Glu	Asn	Val	Glu	Ser	Arg	Pro	Pro	Arg	Trp	Val
		275					280					285			
Glu	Ile	Phe	Ser	Val	Gln	Gln	Phe	Asp	Glu	Lys	Thr	Asn	Gln	Ser	Phe
	290					295					300				
Ser	Leu	Arg	Ala	Ile	Asp	Gly	Asp	Thr	Gly	Ile	Asn	Arg	Ala	Ile	Asn
305					310					315					320
Tyr	Thr	Leu	Ile	Arg	Asp	Asp	Ala	Asp	Asp	Phe	Phe	Ser	Leu	Glu	Val
				325					330					335	
Ile	Glu	Asp	Gly	Ala	Ile	Leu	His	Val	Thr	Glu	Ile	Asp	Arg	Asp	Lys
			340					345					350		
Leu	Glu	Arg	Glu	Leu	Phe	Asn	Leu	Thr	Ile	Val	Ala	Tyr	Lys	Ser	Thr
			355				360					365			
Asp	Ala	Ser	Phe	Ala	Thr	Glu	Ala	His	Ile	Phe	Ile	Ile	Val	Asn	Asp
	370					375						380			
Val	Asn	Asp	Gln	Arg	Pro	Glu	Pro	Leu	His	Lys	Glu	Tyr	Ser	Ile	Asp
385					390					395					400
Ile	Met	Glu	Glu	Thr	Pro	Met	Thr	Leu	Asn	Phe	Asn	Glu	Glu	Phe	Gly
				405					410					415	
Phe	His	Asp	Arg	Asp	Leu	Gly	Glu	Asn	Ala	Gln	Tyr	Thr	Val	Glu	Leu
			420					425					430		
Glu	Asp	Val	Phe	Pro	Pro	Gly	Ala	Ser	Ala	Phe	Tyr	Ile	Ala	Pro	
		435					440				445				
Gly	Ser	Gly	Tyr	Gln	Arg	Gln	Thr	Phe	Ile	Met	Gly	Thr	Ile	Asn	His
	450					455					460				
Thr	Met	Leu	Asp	Tyr	Glu	Asp	Val	Ile	Phe	Gln	Asn	Ile	Ile	Ile	Lys
465					470					475					480
Val	Lys	Ala	Val	Asp	Met	Asn	Asn	Ala	Ser	His	Val	Gly	Glu	Ala	Leu
				485					490					495	
Val	Tyr	Val	Asn	Leu	Ile	Asn	Trp	Asn	Asp	Glu	Leu	Pro	Ile	Phe	Glu
			500					505					510		
Glu	Ser	Ser	Tyr	Ser	Ala	Ser	Phe	Lys	Glu	Thr	Val	Gly	Ala	Gly	Phe





Asn Gln Asp Glu Val Glu Ile Phe Val Val Leu Leu Asp Val Asn Asp  
 980 985 990  
 Asn Ala Pro Glu Met Pro Leu Pro Asp Glu Leu Arg Phe Asp Val Ser  
 995 1000 1005  
 Glu Gly Ala Val Ala Gly Val Arg Val Leu Pro Glu Ile Tyr Ala Pro  
 1010 1015 1020  
 Asp Arg Asp Glu Pro Asp Thr Asp Asn Ser Arg Val Gly Tyr Gly Ile  
 1025 1030 1035 1040  
 Leu Asp Leu Thr Ile Thr Asp Arg Asp Ile Glu Val Pro Asp Leu Phe  
 1045 1050 1055  
 Thr Met Ile Ser Ile Glu Asn Lys Thr Gly Glu Leu Glu Thr Ala Met  
 1060 1065 1070  
 Asp Leu Arg Gly Tyr Trp Gly Thr Tyr Glu Ile Phe Ile Glu Ala Phe  
 1075 1080 1085  
 Asp His Gly Tyr Pro Gln Gln Arg Ser Asn Glu Thr Tyr Thr Leu Val  
 1090 1095 1100  
 Ile Arg Pro Tyr Asn Phe His His Pro Val Phe Val Phe Pro Gln Pro  
 1105 1110 1115 1120  
 Asp Ser Val Ile Arg Leu Ser Arg Glu Arg Ala Thr Glu Gly Gly Val  
 1125 1130 1135  
 Leu Ala Thr Ala Ala Asn Glu Phe Leu Glu Pro Ile Tyr Ala Thr Asp  
 1140 1145 1150  
 Glu Asp Gly Leu His Ala Gly Ser Val Thr Phe His Val Gln Gly Asn  
 1155 1160 1165  
 Glu Glu Ala Val Gln Tyr Phe Asp Ile Thr Glu Val Gly Ala Gly Glu  
 1170 1175 1180  
 Asn Ser Gly Gln Leu Ile Leu Arg Gln Leu Phe Pro Glu Gln Ile Arg  
 1185 1190 1195 1200  
 Gln Phe Arg Ile Thr Ile Arg Ala Thr Asp Gly Gly Thr Glu Pro Gly  
 1205 1210 1215  
 Pro Leu Trp Thr Asp Val Thr Phe Ser Val Val Phe Val Pro Thr Gln  
 1220 1225 1230  
 Gly Asp Pro Val Phe Ser Glu Asn Ala Ala Thr Val Ala Phe Phe Glu  
 1235 1240 1245  
 Gly Glu Glu Gly Leu Arg Glu Ser Phe Glu Leu Pro Gln Ala Glu Asp  
 1250 1255 1260  
 Leu Lys Asn His Leu Cys Glu Asp Asp Cys Gln Asp Ile Tyr Tyr Arg  
 1265 1270 1275 1280  
 Phe Ile Asp Gly Asn Asn Glu Gly Leu Phe Val Leu Asp Gln Ser Ser  
 1285 1290 1295  
 Asn Val Ile Ser Leu Ala Gln Glu Leu Asp Arg Glu Val Ala Thr Ser  
 1300 1305 1310  
 Tyr Thr Leu His Ile Ala Ala Ser Asn Ser Pro Asp Ala Thr Gly Ile  
 1315 1320 1325  
 Pro Leu Gln Thr Ser Ile Leu Val Val Thr Val Asn Val Arg Glu Ala  
 1330 1335 1340  
 Asn Pro Arg Pro Ile Phe Glu Gln Asp Leu Tyr Thr Ala Gly Ile Ser  
 1345 1350 1355 1360  
 Thr Leu Asp Ser Ile Gly Arg Glu Leu Leu Thr Val Arg Ala Ser His  
 1365 1370 1375  
 Thr Glu Asp Asp Thr Ile Thr Tyr Thr Ile Asp Arg Ala Ser Met Gln  
 1380 1385 1390  
 Leu Asp Ser Ser Leu Glu Ala Val Arg Asp Ser Ala Phe Ala Leu His  
 1395 1400 1405  
 Ala Thr Thr Gly Val Leu Ser Leu Asn Met Gln Pro Thr Ala Ser Met  
 1410 1415 1420  
 His Gly Met Phe Glu Phe Asp Val Ile Ala Thr Asp Thr Ala Ser Ala

1425                      1430                      1435                      1440  
 Ile Asp Thr Ala Arg Val Lys Val Tyr Leu Ile Ser Ser Gln Asn Arg  
                                  1445                      1450                      1455  
 Val Thr Phe Ile Phe Asp Asn Gln Leu Glu Thr Val Glu Gln Asn Arg  
                                  1460                      1465                      1470  
 Asn Phe Ile Ala Ala Thr Phe Ser Thr Gly Phe Asn Met Thr Cys Asn  
                                  1475                      1480                      1485  
 Ile Asp Gln Val Val Pro Phe Ser Asp Ser Ser Gly Val Ala Gln Asp  
                                  1490                      1495                      1500  
 Asp Thr Thr Glu Val Arg Ala His Phe Ile Arg Asp Asn Val Pro Val  
 1505                      1510                      1515                      1520  
 Gln Ala Gln Glu Val Glu Ala Val Arg Ser Asp Thr Val Leu Leu Arg  
                                  1525                      1530                      1535  
 Thr Ile Gln Leu Met Leu Ser Thr Asn Ser Leu Val Leu Gln Asp Leu  
                                  1540                      1545                      1550  
 Val Thr Gly Asp Thr Pro Thr Leu Gly Glu Glu Ser Met Gln Ile Ala  
                                  1555                      1560                      1565  
 Val Tyr Ala Leu Ala Ala Leu Ser Ala Val Leu Gly Phe Leu Cys Leu  
                                  1570                      1575                      1580  
 Val Leu Leu Leu Ala Leu Phe Cys Arg Thr Arg Ala Leu Asn Arg Gln  
 1585                      1590                      1595                      1600  
 Leu Gln Ala Leu Ser Met Thr Lys Tyr Gly Ser Val Asp Ser Gly Leu  
                                  1605                      1610                      1615  
 Asn Arg Ala Gly Leu Ala Pro Gly Thr Asn Lys His Ala Val Glu Gly  
                                  1620                      1625                      1630  
 Ser Asn Pro Met Trp Asn Glu Ala Ile Arg Ala Pro Asp Phe Asp Ala  
                                  1635                      1640                      1645  
 Ile Ser Asp Ala Ser Gly Asp Ser Asp Leu Ile Gly Ile Glu Asp Met  
                                  1650                      1655                      1660  
 Pro Gln Phe Arg Asp Asp Tyr Phe Pro Pro Gly Asp Thr Asp Ser Ser  
 1665                      1670                      1675                      1680  
 Ser Gly Ile Val Leu His Met Gly Glu Ala Thr Asp Asn Lys Pro Val  
                                  1685                      1690                      1695  
 Thr Thr His Gly Asn Asn Phe Gly Phe Lys Ser Thr Pro Tyr Leu Pro  
                                  1700                      1705                      1710  
 Gln Pro His Pro Lys  
                                  1715

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 <212> PRT  
 <213> Bombyx mori

<400> 9  
 Met Gly Val Asp Val Arg Ile Leu Ala Thr Leu Leu Leu Ile Tyr Ala  
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                                  20                      25                      30  
 Arg Pro Pro Arg Pro Asp Leu Pro Glu Leu Asp Phe Glu Gly Gln Thr  
                                  35                      40                      45  
 Trp Ser Gln Arg Pro Leu Ile Pro Ala Ala Asp Arg Glu Asp Val Cys  
                                  50                      55                      60  
 Met Asp Gly Tyr His Ala Met Thr Pro Thr Tyr Gly Thr Gln Ile Ile  
 65                      70                      75                      80  
 Tyr Met Glu Glu Glu Ile Glu Gly Glu Val Pro Ile Ala Lys Leu Asn  
                                  85                      90                      95

Tyr	Arg	Gly	Pro	Asn	Val	Pro	Tyr	Ile	Glu	Pro	Ala	Phe	Leu	Ser	Gly		
			100					105					110				
Ser	Phe	Asn	Leu	Leu	Val	Pro	Val	Ile	Arg	Arg	Ile	Pro	Asp	Ser	Asn		
		115					120					125					
Gly	Glu	Trp	His	Leu	Ile	Ile	Thr	Gln	Arg	Gln	Asp	Tyr	Glu	Thr	Pro		
	130				135						140						
Gly	Met	Gln	Gln	Tyr	Val	Phe	Asn	Ile	Arg	Ile	Asp	Gly	Glu	Thr	Leu		
145				150					155						160		
Val	Ala	Gly	Val	Ser	Leu	Leu	Ile	Val	Asn	Ile	Asp	Asp	Asn	Ala	Pro		
				165					170						175		
Ile	Ile	Gln	Ala	Leu	Glu	Pro	Cys	Gln	Val	Asp	Glu	Leu	Gly	Glu	Ala		
			180					185					190				
Arg	Leu	Thr	Glu	Cys	Val	Tyr	Val	Val	Thr	Asp	Ala	Asp	Gly	Arg	Ile		
		195					200					205					
Ser	Thr	Gln	Phe	Met	Gln	Phe	Arg	Ile	Asp	Ser	Asp	Arg	Gly	Asp	Asp		
	210					215					220						
Lys	Ile	Phe	Tyr	Ile	Gln	Gly	Ala	Asn	Ile	Pro	Gly	Glu	Trp	Ile	Arg		
225				230					235						240		
Met	Thr	Met	Thr	Val	Gly	Ile	Asn	Glu	Pro	Leu	Asn	Phe	Glu	Thr	Asn		
				245					250					255			
Pro	Leu	His	Ile	Phe	Ser	Val	Thr	Ala	Leu	Asp	Ser	Leu	Pro	Asn	Thr		
			260					265					270				
His	Thr	Val	Thr	Leu	Met	Val	Gln	Val	Glu	Asn	Val	Glu	His	Arg	Pro		
		275					280					285					
Pro	Arg	Trp	Val	Glu	Ile	Phe	Ala	Val	Gln	Gln	Phe	Asp	Glu	Lys	Thr		
	290					295					300						
Ala	Gln	Ser	Phe	Pro	Val	Arg	Ala	Ile	Asp	Gly	Asp	Thr	Gly	Ile	Asn		
305				310					315						320		
Lys	Pro	Ile	His	Tyr	Arg	Leu	Glu	Thr	Ala	Glu	Glu	Asp	Thr	Phe	Phe		
				325					330					335			
His	Ile	Arg	Thr	Ile	Glu	Gly	Gly	Arg	Ser	Gly	Ala	Ile	Leu	Tyr	Val		
			340					345					350				
Asp	Pro	Ile	Asp	Arg	Asp	Thr	Leu	Gln	Arg	Glu	Val	Phe	Gln	Leu	Ser		
		355					360					365					
Ile	Ile	Ala	Tyr	Lys	Tyr	Asp	Asn	Glu	Ser	Ser	Ala	Thr	Ala	Ala	Asn		
	370					375					380						
Val	Val	Ile	Ile	Val	Asn	Asp	Ile	Asn	Asp	Gln	Arg	Pro	Glu	Pro	Leu		
385				390					395						400		
Phe	Lys	Glu	Tyr	Arg	Leu	Asn	Ile	Met	Glu	Glu	Thr	Ala	Leu	Thr	Leu		
				405					410					415			
Asn	Phe	Asp	Gln	Glu	Phe	Gly	Phe	His	Asp	Arg	Asp	Leu	Gly	Gln	Asn		
			420					425					430				
Ala	Gln	Tyr	Thr	Val	Arg	Leu	Glu	Ser	Asp	Tyr	Pro	Ala	Asp	Ala	Ala		
	435						440					445					
Lys	Ala	Phe	Tyr	Ile	Ala	Pro	Glu	Val	Gly	Tyr	Gln	Arg	Gln	Thr	Phe		
	450					455					460						
Ile	Met	Gly	Thr	Ala	Asn	His	Lys	Met	Leu	Asp	Tyr	Glu	Val	Pro	Glu		
465				470					475						480		
Phe	Gln	Arg	Ile	Arg	Leu	Arg	Val	Ile	Ala	Thr	Asp	Met	Asp	Asn	Glu		
				485					490					495			
Glu	His	Val	Gly	Val	Ala	Tyr	Val	Tyr	Ile	Asn	Leu	Ile	Asn	Trp	Asn		
			500					505					510				
Asp	Glu	Glu	Pro	Ile	Phe	Glu	His	Ser	Val	Gln	Asn	Val	Ser	Phe	Lys		
	515						520					525					
Glu	Thr	Glu	Gly	Lys	Gly	Phe	Phe	Val	Ala	Asn	Val	Arg	Ala	His	Asp		
	530					535					540						
Arg	Asp	Ile	Asp	Asp	Arg	Val	Glu	His	Thr	Leu	Met	Gly	Asn	Ala	Asn		

545	Asn	Tyr	Leu	Ser	Ile	Asp	Lys	Asp	Thr	Gly	Asp	Ile	His	Val	Thr	Gln	550	555	560
	Asp	Asp	Phe	Phe	Asp	Tyr	His	Arg	Gln	Ser	Glu	Leu	Phe	Val	Gln	Val	565	570	575
																	580	585	590
	Arg	Ala	Asp	Asp	Thr	Leu	Gly	Glu	Pro	Phe	His	Thr	Ala	Thr	Ser	Gln	595	600	605
	Leu	Leu	Ile	His	Leu	Glu	Asp	Ile	Asn	Asn	Thr	Pro	Pro	Thr	Leu	Arg	610	615	620
	Leu	Pro	Arg	Gly	Ser	Pro	Asn	Val	Glu	Glu	Asn	Val	Pro	Glu	Gly	Tyr	625	630	635
	Ile	Ile	Thr	Ser	Glu	Ile	Arg	Ala	Thr	Asp	Pro	Asp	Thr	Thr	Ala	Glu	645	650	655
	Leu	Arg	Phe	Glu	Ile	Asp	Trp	Thr	Thr	Ser	Tyr	Ala	Thr	Lys	Gln	Gly	660	665	670
	Arg	Glu	Ala	Asn	Pro	Ile	Glu	Phe	His	Asn	Cys	Val	Glu	Ile	Glu	Thr	675	680	685
	Ile	Tyr	Pro	Ala	Ile	Asn	Asn	Arg	Gly	Ser	Ala	Ile	Gly	Arg	Leu	Val	690	695	700
	Val	Lys	Lys	Ile	Arg	Glu	Asn	Val	Thr	Ile	Asp	Tyr	Glu	Glu	Phe	Glu	705	710	715
	Met	Leu	Tyr	Leu	Thr	Val	Arg	Val	Arg	Asp	Leu	Asn	Thr	Val	Ile	Gly	725	730	735
	Asp	Asp	Tyr	Asp	Glu	Ser	Thr	Phe	Thr	Ile	Thr	Ile	Ile	Asp	Met	Asn	740	745	750
	Asp	Asn	Pro	Pro	Ile	Trp	Val	Pro	Gly	Thr	Leu	Glu	Gln	Ser	Leu	Arg	755	760	765
	Val	Arg	Glu	Met	Ser	Asp	Ala	Gly	Val	Val	Ile	Gly	Thr	Leu	Thr	Ala	770	775	780
	Thr	Asp	Ile	Asp	Gly	Pro	Leu	Tyr	Asn	Gln	Val	Arg	Tyr	Thr	Met	Lys	785	790	795
	Ala	Asn	Glu	Gly	Thr	Pro	Glu	Asn	Leu	Leu	Met	Ile	Asp	Phe	Tyr	Thr	805	810	815
	Gly	Gln	Ile	Thr	Val	Lys	Thr	Ser	Gly	Ala	Ile	Asp	Ala	Asp	Val	Pro	820	825	830
	Arg	Arg	Tyr	Asn	Leu	Tyr	Tyr	Thr	Val	Val	Ala	Thr	Asp	Arg	Cys	Tyr	835	840	845
	Ala	Glu	Asp	Pro	Asp	Asp	Cys	Pro	Asp	Asp	Pro	Thr	Tyr	Trp	Glu	Thr	850	855	860
	Pro	Gly	Gln	Val	Val	Ile	Gln	Ile	Ile	Asp	Thr	Asn	Asn	Lys	Ile	Pro	865	870	875
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	Ala	Val	Ser	Gly	Asp	Glu	Val	Val	Lys	Val	Ile	Gly	Ser	Asp	Leu	Asp	900	905	910
	Arg	Asp	Asp	Ile	Tyr	His	Thr	Ile	Arg	Tyr	Gln	Ile	Asn	Tyr	Ala	Val	915	920	925
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Leu Ser Trp Ser Val Ser Glu Ser Leu Thr Lys Gly Thr Arg Leu Gln  
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 Arg Ile Val Ala Thr Asp Glu Asp Gly Leu His Ala Gly Gln Val Ala  
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 Phe Glu Val Val Gly Asp Thr Glu Ala Val Asp Tyr Phe His Ile Val  
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 Asn Asp Gly Glu Asn Ser Gly Thr Leu Met Leu Lys Gln Leu Phe Pro  
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 Thr Glu Pro Arg Pro Leu Ser Thr Asp Cys Thr Phe Ser Val Val Phe  
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 Val Pro Ile Gln Gly Glu Pro Ile Phe Pro Thr Ser Thr His Thr Val  
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 Arg Ala Glu Asp Arg Lys Asn His Leu Cys Ser Asp Asp Cys His Asn  
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30







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Ile	Glu	Val	Pro	Glu	Leu	Phe	Val	Met	Ile	Gln	Ile	Ala	Asn	Val	Thr	
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Gly	Glu	Leu	Glu	Thr	Ala	Met	Asp	Leu	Lys	Gly	Tyr	Trp	Gly	Thr	Tyr	
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Ala	Ile	His	Ile	Arg	Ala	Phe	Asp	His	Gly	Ile	Pro	Gln	Met	Ser	Met	
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Glu	Phe	Val	Phe	Pro	Thr	Asn	Asp	Ala	Val	Ile	Arg	Leu	Ala	Arg	Glu	
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Glu	Arg	Ile	Ser	Ala	Thr	Asp	Pro	Asp	Gly	Leu	His	Ala	Gly	Val	Val	
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Thr	Phe	Gln	Val	Val	Gly	Asp	Glu	Glu	Ser	Gln	Arg	Tyr	Phe	Gln	Val	
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Val	Asn	Asp	Gly	Glu	Asn	Leu	Gly	Ser	Leu	Arg	Leu	Leu	Gln	Ala	Val	
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Pro	Glu	Glu	Ile	Arg	Glu	Phe	Arg	Ile	Thr	Ile	Arg	Ala	Thr	Asp	Gln	
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Gly	Thr	Asp	Pro	Gly	Pro	Leu	Ser	Thr	Asp	Met	Thr	Phe	Arg	Val	Val	
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Phe	Val	Pro	Thr	Gln	Gly	Glu	Pro	Arg	Phe	Ala	Ser	Ser	Glu	His	Ala	
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Ser	Ile	Tyr	Tyr	Arg	Ile	Ile	Asp	Gly	Asn	Ser	Glu	Gly	His	Phe	Gly	
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Glu	Gln	Ser	Ala	Ser	His	Thr	Leu	Gln	Val	Ala	Ala	Ser	Asn	Ser	Pro	
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Asp	Gly	Gly	Ile	Pro	Leu	Pro	Ala	Ser	Ile	Leu	Thr	Val	Thr	Val	Thr	
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Val	Arg	Glu	Ala	Asp	Pro	Arg	Pro	Val	Phe	Val	Arg	Glu	Leu	Tyr	Thr	
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	1380							1385					1390			
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Phe	Val	Leu	Asn	Ala	Gln	Thr	Gly	Val	Leu	Thr	Leu	Asn	Ile	Gln	Pro	
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Asp Asn Val Pro Val Leu Ala Asp Glu Ile Glu Gln Ile Arg Ser Asp				
	1525		1530	1535
Leu Val Leu Leu Ser Ser Ile Gln Thr Thr Leu Ala Ala Arg Ser Leu				
	1540		1545	1550
Val Leu Gln Asp Leu Leu Thr Asn Ser Ser Pro Asp Ser Ala Pro Asp				
	1555		1560	1565
Ser Ser Leu Thr Val Tyr Val Leu Ala Ser Leu Ser Ala Val Leu Gly				
	1570		1575	1580
Phe Met Cys Leu Val Leu Leu Leu Thr Phe Ile Ile Arg Thr Arg Ala				
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Leu Asn Arg Arg Leu Glu Ala Leu Ser Met Thr Lys Tyr Gly Ser Leu				
	1605		1610	1615
Asp Ser Gly Leu Asn Arg Ala Gly Ile Ala Ala Pro Gly Thr Asn Lys				
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His Thr Val Glu Gly Ser Asn Pro Ile Phe Asn Glu Ala Ile Lys Thr				
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Pro Asp Leu Asp Ala Ile Ser Glu Gly Ser Asn Asp Ser Asp Leu Ile				
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Gly Ile Glu Asp Leu Pro His Phe Gly Asn Val Phe Met Asp Pro Glu				
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Gln Phe Arg Lys Ile				
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